AI for Customer Engagement

Dmitriy Solopov
AI BDM, SMART business

http://smart-it.com/ru/ai
SMART business — Ваш партнер будущего

SMART business предоставляет консультационные услуги по выбору, разработке, обучению и сопровождению ERP и CRM систем, а также услуги в сфере внедрения систем управления предприятием линейки Microsoft Dynamics, Microsoft Dynamics AX, Microsoft Dynamics NAV, Microsoft Dynamics CRM для компаний различных форм собственности, масштабов и отраслей.

9 лет успешной работы на IT-рынке  
Более 200 компаний среди наших клиентов  
200 квалифицированных и опытных IT-профессионалов  
Более 40 стран-клиентов в мире  
7 золотых компетенций Microsoft

Microsoft Partner  
2018 Partner of the Year Winner  
Ukraine Partner of the Year

Dynamics 365  
Dynamics NAV

Microsoft  
All Inner Circle Partner

OneDrive for Business  
Power BI

President's Club  
for Microsoft Dynamics

Skype for Business  
OneNote

Microsoft Dynamics  
Partner of the Year in Ukraine 2010-2017

Azure Machine Learning  
SharePoint

Microsoft Dynamics  
ISV Partner of the Year in CEE

Yammer  
Outlook

Project  
Teams
SMART BUSINESS
— MICROSOFT COUNTRY PARTNER OF THE YEAR 2018

“We are honored to recognize SMART business of Ukraine as a Microsoft Country Partner of the Year,” said Gavriella Schuster, corporate vice president, One Commercial Partner, Microsoft Corp. “SMART business has distinguished itself as a top partner, exemplifying the remarkable expertise and innovation we see in our Microsoft partner community to deliver transformative solutions.”

Gavriella Schuster
Background

- AI in short
- Microsoft Cognitive Services
- Approach to NBA
- Engage with AI
RULE-BASED SYSTEMS \rightarrow A.I. \rightarrow MACHINE LEARNING
Why now? Advances that make AI real

Vast amounts of data + Huge computational power
Future of Software

Program Logic
+
Artificial Intelligence
“Programming Oriented” Application Architecture
“AI Oriented” Application Architecture
**SW Development**

- Data Schemas
- Functions & Code
- Debugger to process
- Use telemetry to inform

**AI Development**

- Data Curation + Data Labeling
- Machine Learning Models
- A/B Testing, Experimentation
- Telemetry driven learning
AI Landscape

Applications
- Office 365
- Dynamics
- SwiftKey

Pre-Packaged
- Cognitive Services Platform
  - Vision
  - Language
  - Speech
  - Search
  - Knowledge

Pre-Packaged Extend
- Custom Vision
- Custom Speech
- Language Understanding
- Custom Search
- Custom Decision Service

Business AI
- Customer Care Intelligence
- Sales Intelligence
- Market Intelligence

Custom
- Vision
- Text Analytics

Democratized

Data Scientist

COMPLEXITY
## Cognitive Services

### Overview

<table>
<thead>
<tr>
<th>Vision</th>
<th>Speech</th>
<th>Language</th>
<th>Search</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extract Image insights</td>
<td>Give me directions to the nearest local branch</td>
<td>Play today’s customer call recording</td>
<td>Search for ‘fraud prevention’</td>
</tr>
</tbody>
</table>

### Language Features
- **Intent:** PlayCall
- **Content:** Customer#
- **DateTime:** date: today

### Speech Features
- Spoken audio to text
- Text to spoken audio
- Recognize speaker

### Search Features
- Information Communications Media Market News
- The Big Question: In-House or Outsourced Fraud Protection?
- How to Protect Your Business from Online Fraud this Holiday Season
Custom Vision
Cognitive Services

Upload Images
Bring your own labeled images, or use Custom Vision to quickly add tags to any unlabeled images.

Train
Use your labeled images to teach Custom Vision the concepts you care about.

Evaluate
Use simple REST API calls to quickly tag images with your new custom computer vision model.

Visual Intelligence Made Easy
Easily customize your own state-of-the-art computer vision models that fit perfectly with your unique use case. Just bring a few examples of labeled images and let Custom Vision do the hard work.
Face Detection
Face API detects up to 64 human faces with high precision face location in an image. And the image can be specified by file in bytes or valid URL.

Face Recognition
Face recognition is widely used in many scenarios including security, natural user interface, image content analysis and management, mobile apps, and robotics. Four face recognition functions are provided: face verification, finding similar faces, face grouping, and person identification.

Key features:
• Detect human faces and compare similar ones
• Organize images into groups based on similarity
• Identify previously tagged people in images
For optimal result in Speech to Text, customize:

- acoustic models for your use environments, such as vehicles
- field-specific vocabulary and grammar, such as medical or IT
- pronunciation of abbreviations and acronyms, such as "IOU" for "I owe you."
LUIS aims to be the most comprehensive cloud-based service for conversational understanding, and the easiest to use for developers with no AI expertise:

- extracts intent/action and entities from user utterances
- includes dictionaries mined from the web, which can be extended with customer-specific terms

Roadmap highlights coming up:

- 2H2018 easier to use together with Azure Bot, Speech and QnA Maker
QnA Maker
Cognitive Services

Q&A

- **Who are the target audience for the QnA Maker tool?**
  QnA Maker is primarily meant to provide a FAQ data source which you can query from your Bot/Application. Although developers will find this useful, content owners will especially benefit from this tool. QnA Maker is a completely no-code way of managing the content that powers your Bot/Application.

- **How do I login to the QnA Maker Portal?**
  You can login with your Microsoft account.

- **Is the QnA Maker Service free?**
  Yes, currently the QnA Maker tool is free to use. However, we do meter the usage per account. See the Subscription Keys section of the documentation for details.

- **My URLs have valid FAQ content, but the tool cannot extract them. Why not?**
  It’s possible that the tool is not able to auto-extract QnA from valid FAQ URLs. In such cases, you have an option to copy-paste the QnA content in a txt and try ingesting it. Alternately, you can always editorially add content to your knowledge base.
Extract insights from customer feedback and social network postings.

I had a wonderful trip to Seattle and enjoyed seeing the Space Needle!

- submit up to 100 calls per minute, each with up to 1,000 documents of up to 5,000 characters each
Translation
Cognitive Services

Translator Text – translate dynamic content in your mobile, desktop and web apps to and from 60+ supported languages
✓ automatically detect languages
✓ transliterate into different alphabets

Translator Speech – service assembly
Content Moderator
Cognitive Services

Content Moderator allows businesses to manage risks associated with user generated content (UGC) by using machine-assisted content moderation APIs and a human review tool. Features include:

✓ Detection of potential adult, racy, and offensive, illegal, and unwanted image & video content
✓ Identification of possible profanity and undesirable text
✓ Built-in human review tool for best results
✓ Workflows that allow you to add other API's and extract more content insights

Customers using Content Moderator technologies include:

✓ Online marketplaces/e-Commerce sites for moderating catalogs and chatbots
✓ Social media/messaging/gaming platforms for moderating user content and digital assets
✓ Enterprises/K-12 solution providers moderating user content and information chatbots
✓ Global content moderation service providers using AI to augment human moderation teams
Photographic memory of a customer
It’s tough to make predictions – especially about the future

<table>
<thead>
<tr>
<th>Trigger / Activity</th>
<th>Examples</th>
<th>Used To Trigger:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propensity to Purchase</td>
<td>(P↑ by 30%) &amp; (V &gt;= $250)</td>
<td>Cross-Sell Message</td>
</tr>
<tr>
<td>Churn Likelihood</td>
<td>(P↑ by 30%) &amp; (V &gt;= $5000)</td>
<td>Retention Message</td>
</tr>
<tr>
<td>Interaction Lapse</td>
<td>No Interactions &gt;= 30 Days</td>
<td>Next-Best-Action Message</td>
</tr>
<tr>
<td>Crossing Geo-Fence</td>
<td>Mobil Enters Trade Area</td>
<td>Contextual Message / Alert</td>
</tr>
<tr>
<td>Abandoned Cart</td>
<td>(Open &gt; 1 Hour) &amp; (No Purchase)</td>
<td>Re-Targeting Message</td>
</tr>
<tr>
<td>Product Expiration</td>
<td>Date &gt; Product Expiration Date</td>
<td>1-Click Replenishment Offer</td>
</tr>
<tr>
<td>Upgrade Available</td>
<td>Eligibility = Y, CLV &gt; $2500</td>
<td>1-Click Upgrade Offer</td>
</tr>
<tr>
<td>Life-Stage Event</td>
<td>Marriage, Birth, Home, etc.</td>
<td>Contextual Message</td>
</tr>
<tr>
<td>Payment Missed</td>
<td>(Late &gt; 30 Days) &amp; (CLV &lt;= $1000)</td>
<td>Reminder Message, Account Lock</td>
</tr>
<tr>
<td>Repeated Outage</td>
<td>Outage Count &gt;=3</td>
<td>Service Message, Discount Offer</td>
</tr>
</tbody>
</table>
Next best action

Collections Strategy
(Next Best Collections Action)

Service Strategy
(Next Best Retention Action)

Retention Strategy
(Next Best Retention Action)

Sales Strategy
(Next Best Offer)

No-Action Strategy
(Take No Action)

Next Best Action
(NBA)

- If in arrears
- Else if service issue
- Else if churn likely, CLV high
- Else if profitable sale likely
- Else
Opening with online channels

- **Web Channel** (3-4 Months)
  - AI Delivers Real-Time Content for Authenticated Web

- **Adaptive Machine Learning** (3 Months)
  - Automated Machine Learning Integrated Across Channels & Functions

- **Predictive IVR** (3 Months)
  - AI Optimizes Teledphony Experience & Call Routing

- **Mobile App** (3-6 Month Project)
  - AI Determines Real-Time App Content

- **Real-Time Trigger Messages** (2 Month Project)
  - AI Triggers Actions Across Channels in Moments of Need

- **Paid Digital Ads** (2 Month Project)
  - Direct, Real-Time Integration Between AI and Paid Platforms

- **Mobile Web** (1-2 Months)
  - AI Delivers Real-Time Mobile Web Content

- **Inbound Call-Center** (3 Months)
  - AI Delivers Real-Time Agent Content

- **Inbound Retail** (3 Months)
  - AI Delivers Real-Time Agent Content Optimized For Mobile / Tablet

- **Geo-Fencing** (2 Month Project)
  - Contextual, Location-Based Offers & Messages

- **Email & SMS Channels** (3-4 Month Project)
  - Email, SMS, & Direct Mail Message Optimization By AI
Activating agent channels

- **Inbound Call-Center (3 Months)**
  - AI Delivers Real-Time Agent Content

- **Adaptive Machine Learning (3 Months)**
  - Automated Machine Learning Integrated Across Channels & Functions

- **Web Channel (1-4 Months)**
  - AI Delivers Real-Time Content for Authenticated Web

- **Mobile App (2-4 Month Project)**
  - AI Determines Real-Time App Content

- **Real-Time Trigger Messages (3-Month Project)**
  - AI Triggers Actions Across Channels In Moments of Need

- **Paid Digital Ads (3-Month Project)**
  - Direct, Real-Time Integration Between AI and Paid Platforms

- **Inbound Retail (3 Months)**

- **Predictive IVR (2 Months)**

- **Mobile Web (1-2 Months)**

- **Geo-Fencing (2-Month Project)**

- **Email, SMS, & Direct Mail Message Optimization By AI**

- **Email & SMS Channels (3-4 Month Project)**
Ramp up with real time
### Acquire
- Marketing Campaigns
- Search on ecommerce data, social media, demographics, historical transactions and interactions
- Couponing and First Time Buyer Discounts
- Identify top customer opportunities to nurture in drip campaign or cross-sell activities

### Optimize
- Optimize store layout and product assortment
- Push information to customers via personal devices
- Suggest additional products at discounts
- Personalize experiences based on behavior
- Develop customer profiles using shopping behavior and metadata

### Support
- Track Movement within store and deploy retail help as needed
- Monitor conversations between bots & customers
- Real-time call center analytics to understand customer query and optimally route call
- Provide service agents with information on historical interactions, complaints, etc.

### Repeat
- Identify and reward repeat shoppers
- Prevent churn
- Offer discounts
- Identify top customer pain points to improve service or standardize a resolution
- Track product performance using social media
- Run sentiment analysis on customer reviews
The role of Cognitive Services
making it easier to infuse AI

- Extract identity
- Extract intent
- Detect empty shelves

- How deep in the stack?
- Everyone
  - Specialized
  - Effort
  - Developer
  - Expert
  - Pioneer

- How deep in the stack?
  - Pre-built, customizable services
  - ML
  - Frameworks

- OCR
- Text
- Vision
- Speech
- Translation
- Face
- QnA

- F1
- F2
- F3
- F4

- Use case features

- Generic
- Specialized
Ingest paper use case
multiple applications to customer acquisition and operations

Applications
- account creation, identification
- credit analysis, risk analysis
- order entry, invoice entry
- ...

✓ labor savings on data entry
✓ focus analyst attention

Searchable content
image + markup

```json
{ "Bank Statement": [
  { "bank": "Rural Bank",
    "acc name": "Joe Sample",
    "opening":
      { "balance": "$7,701.18",
        "date": "01/02/2011"
      },
    "deposits": "$70,062.31"
  }]
}
```
Ingest paper use case example

Solution Architecture

Custom Vision

Domain expert describes regions for extraction (1 per doc class)

learned parameters

tagged extraction mask

pre-processor

Doc classifier (per industry)

Form extractors (10s-100s per industry)

training

live ops

SSN: ####-#### Income: #######.##

1000’s – millions of docs per company

W2 Tax Form:

{ "W2 Tax Form":
  { "year": "2018",
    "name": "Joe Sample",
    "address":
    { "number": "921",
      "street": "Getaway Lane"
    }
  }
}

1 Wages: "$77,500.34"
Ingest paper use case

Choices in the AI portfolio

Create searchable content

- Pytorch
- Onnx

Create searchable content

- OCR
- Vision
- Translation

- Tax W2
- Bank Statement
- Forms

Everyone

Developer

Expert

Pioneer

Glue together pre-built services

Build your own

Remember these choices for every use case
Identify customers and staff use case
unlock multifactor authentication

Applications
- access control
- greeting, in-store support
- satisfaction
- ...

✓ nonintrusive identification
✓ on-the-spot instant survey

Assess and react:
- emotion at point-of-help & checkout
- reinforce happiness with rewards, or instant direct to customer care

Practical when:
✓ passwords cumbersome
✓ customer fingerprints not available
✓ staff using gloves, carrying tools etc.

Extra security:
- nonintrusive extra verification before sensitive operations

Face

Emotion

Speaker Verify

Face Verify

train identities live ops

“happy”: 0.999...
“disgust”: 0.6847,
“sadness”: 0.2135,
“happy”: 0.992...
“anger”: 0.0955...
Conversational AI
Azure Bot Service + Cognitive Services

User Input
- Tap
- Type
- Speak
- Adaptive Cards

Bot Features:
- Personality
- Dialogs
- Language Model

Language Understanding

Devices
- Mobile
- Wi-Fi
- Car

Channels
- Skype
- Slack
- Teams

Knowledge Sources
- General Knowledge
- Manuals (PDF)
- Data Sources

AI Capabilities

Microsoft Azure
- LOB Apps
- Office 365
- IFTTT

Enterprise stores

LOB Apps

Conversational AI
Azure Bot Service + Cognitive Services

User Input
- Tap
- Type
- Speak
- Adaptive Cards

Bot Features:
- Personality
- Dialogs
- Language Model

Language Understanding

Devices
- Mobile
- Wi-Fi
- Car

Channels
- Skype
- Slack
- Teams

Knowledge Sources
- General Knowledge
- Manuals (PDF)
- Data Sources

AI Capabilities

Microsoft Azure
- LOB Apps
- Office 365
- IFTTT

Enterprise stores
Customer care use case

investment chasm is smaller than you think

Applications

- marketing & general information
- sales & support
- reach other languages
- ...

✓ labor savings
✓ scale to larger markets

Your call is very important to us! Please wait...

How can I help?

pass if needed, provide context

chasm
Customer care start with:

**QnA Maker** no-code tool for domain practitioners

---

**FAQs, user manuals**

- **Who are the target audience for the QnA Maker tool?**
  QnA Maker is primarily meant to provide a FAQ data source when Bot/Application: Although developers will find this useful, QnA Maker is a completely no-code way of managing the knowledgebase.

- **How do I login to the QnA Maker Portal?**
  You can login with your Microsoft account.

- **Is the QnA Maker Service free?**
  Yes. Currently, the QnA Maker tool is free to use. However, see the Subscription Keys section of the documentation for details.

---

**Knowledgebase (KB)**

channels:

- Skype
- Slack
- Facebook
- SMS
- Email
- Web

- Azure Search
- Fuzzy matching

---

**Live ops**

- no-code management
Customer care
link to multiple sources of content

One intent:
- per KB
- per Operation

LUIS
Intent Classifier

Operation utterances

QnA Maker

Products KB

Stores KB

Operations live data

dispatch on intent

https://docs.microsoft.com/en-us/azure/cognitive-services/QnAMaker/tutorials/integrate-qnamaker-luis
Customer care
Voice and Text, Multilingual, Multistep, Sentiment-Aware Dialogue

https://github.com/Azure-Samples/cognitive-services-csharp-call-center
Customer Understanding
Closing the feedback loop

Applications
- evolve chat bot
- evolve business processes
✓ stay fresh

Evolve:
- Don’t spend one year developing the “perfect bot”
- Launch small, add a new feature every week
- Which feature? Follow your users

Key phrase extraction
Sentiment Analysis
Annotated logs:
+ sentiment
+ intent + entities

Social Media Reviews Voice of Customer

Microsoft Azure Bot

Speech to Text
Recordings (archival)

QnA Maker
Узнайте больше

http://smart-it.com/ai
http://smart-it.com/ru/ai
https://smart-talks.org/
We love you!

SMART business
21 Poliova Street, building B
Kyiv, 03056, Ukraine
+380 (44) 585-3550

www.smart-it.com/ai